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ABSTRACT

The performance of good and poor readers was compared on a series of three visually presented paired associate tasks varying the verbal codability level of response items. Performance of the 32 poor readers was significantly lower than that of the 32 good readers across all three tasks. There were no differences between good and poor readers in their response latencies to label production for the variety of visual materials, nor were there differences between the reader groups in their reported use of visual or verbal rehearsal strategies during task performance. These results were interpreted as being consistent with the possibility of a general visual associative learning dysfunction for poor readers. The data eliminated the explanation of a label production deficit for the poor reader group, but did not rule out the possibility of deficiencies in the covert use of verbal rehearsal strategies. (Author/RL)

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Verbal Codibility in Visual Paired Associate Performance Of Poor Readers

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Reading disability is a major factor in academic underachievement. (Rabinovitch, 1968; Gomez, 1972) There have been many explanations for reading failure. Traditionally, visual perceptual deficits were said to account for reading disability. (Bronner, 1917, Fildes 1921; Gates, 1922; Orton, 1925, 1937) The perceptual deficit view suggests that poor reading is due to an inability to adequately process sensory information, particularly visual. More recently, research has suggested that poor readers do not have visual perceptual deficits, but that verbal coding problems account for their difficulties in learning visual material (i.e. poor readers perceive letters and words accurately, but mislabel them in oral reading because of difficulty in associating verbal responses with their visual symbols.) (Vellutino, Steger & Kandel, 1972).

Some recent studies have suggested that poor readers have learning and memory deficits only with material which is verbal - highly codible, such as familiar letters, (Vellutino, Steger, Harding & Phillips, 1975) while others have demonstrated learning deficits with a variety of materials, both "verbal" and "nonverbal". (Morrison, Giordanni & Nagy, 1977)

Such controversies provided the impetus for the current investigation. The study reported examined one aspect of learning and memory processes in reading disabled children, the role of verbal factors in visual associative learning. Although the main goal was to explore the differential effect of learning "verbal" versus "nonverbal" material, an examination of poor readers' use of verbal strategies to facilitate such learning or memory was also undertaken.

METHOD

Our reading disabled sample was carefully defined to include children who failed to read at grade level in spite of average intelligence, intact hearing and vision, adequate home and educational environment, good emotional adjustment, and normal neurological status. The poor readers were 36 boys in grades 2 and 3 in suburban English middle class schools who were of average general intelligence (full scale IQ of 90 + on a short form of the WISC). Subjects were rated by teachers as poor readers and scored at least one year below grade level on the Gray Oral Reading Test (Form A).

The control group included 36 boys, of the same age, grade and intelligence level but who were rated as average readers and scored at or above grade level on the Gray Oral Reading Test.

The sample characteristics can be seen in Table 1. There was no significant difference between the mean ages of the reader groups. Although both reader groups were of average intelligence, there was a significant difference between the IQ scores (good readers IQ = 113.36 vs IQ of 106.86 for the poor readers). However, since there were no significant correlations between either IQ scores and any of the dependent measures, covarience analysis was unnecessary to partial out any effects of differing intelligence scores for the two reader groups.

PROCEDURE

The study consisted of three main parts:

1. Paired Associate Learning Tasks
2. Observations of Overt Verbal Labeling
3. A Labeling Measure

1. The associative learning of both good and poor readers was examined on three sets of visually presented pairs where the stimuli were highly codible pictures and the codibility of the responses varied to include highly codible letters, medium codible geometric shapes, and abstract shapes, low in codibility. All materials had been rated for their codibility and their visual complexity in a pilot study.

Three sets of 15 pairs were presented visually to all subjects in one of 6 counterbalanced orders. Subjects were tested after one study trial of each set. Correct responses were selected from amongst three choices on a separate card. Scores were the mean number correct/15 on each set.

RESULTS

The scores for the paired associate tasks were analyzed by analysis of varience. As can be seen in Figure 1, the performance of the poor readers was significantly lower ($p < .0001$) than good readers on all three paired associate sets regardless of the codibility level. There was no significant difference between the tasks themselves nor any significant interaction between reader group and task codibility level. This finding suggests that poor readers, boys aged 7 ½ - 9 ½ years,

have some form of associative learning deficit for visual material, unrelated to its codibility.

2. Observations of Overt Verbal Labeling

Differential use of verbal coding strategies by good and poor readers during paired associate task performance was further evaluated by recording observations of verbal labeling (e.g. whispered or outloud rehearsals. Although there was a trend for more good readers (22%) than poor readers (8%) to whisper or rehearse verbally spontaneously, this difference was not significant in a Chi Square analysis.

3. Labeling Measure

Since many studies have found poor readers to be deficient in naming and labeling, particularly of letters, the label production ability of both good and poor readers for all experimental materials was also examined. Each item used in paired associate sets was presented visually, in random order, to each subject. Two measures were taken: the label given and latencies to label production.

As can be seen in Figure 2, an analysis of varience of response latency scores indicated no significant difference between good and poor readers on latency to name any of the visual materials. These data indicate equivalent label production ability for both reader groups and effectively rule out label production deficiency as an explanation for poor readers' generally lower performance on the earlier paired associate tasks.

DISCUSSION

Results of paired associate sets demonstrated strongly that poor readers in our study did have some form of associative learning deficiency for material presented visually which was unrelated to codibility. Poor readers had lower scores, compared to good readers for learning all tasks, both high and low in codibility, suggesting that differences in some aspect of visual perceptual learning may well be a factor contributing to reading disability in boys of the ages studied here. We have come full circle from the early emphasis on visual perceptual distortions to the recent focus on verbal coding deficiencies as unique explanations of reading disability.

Results of this study however do not support unitary views of reading disability. Instead, the data are consistent with studies suggesting more general associative learning deficits for poor readers. (Morrison, Giordanni & Nagy, 1977) Our findings point out the importance of reexamining visual as well as verbal factors in the learning and memory of poor readers.

Another important finding was that a label production deficit could not explain poor readers' lower performance on the visual associative tasks. Poor readers in this study were able to produce labels (i.e. name all materials) with equal facility and speed to the good readers. Although previous research has suggested that poor readers might have labeling deficits, particularly for highly codible material such as letters, results of this study indicated that poor readers were able to label even the unfamiliar abstract shapes with equal facility to the good readers.

However, labeling ability is only one aspect of verbal mediation. The fact that poor readers did not have a label production deficits does not exclude deficits in other aspects of verbal coding perhaps at a more covert level (i.e. differential use of such verbal coding strategies during learning and memory). A clue for this was found in the trend for more good than poor readers to use verbal rehearsal spontaneously during paired associate performance. The ability to produce labels to letters or shapes does not indicate that a child can effectively use these labels as verbal mediators.

In conclusion, this study emphasizes the importance of considering unique learning styles among reading disabled children (i.e. differing use of both visual and verbal coding strategies during learning and memory). Further studies in the area of covert strategy use should provide some direct implications for remedial education.

Table 1

Summary of Subject Characteristics (n = 72)

Mean Scores	Poor readers (n = 36)	Good readers (n = 36)	t*	p
Age (in months)	106.56	104.86	1.283	NS
Gray Oral Reading Test (grade level)	2.19	3.85	6.743	.001
Reading level difference score[b]	-1.51	+.36		
Prorated overall WISC IQ score	106.86	113.36	2.825	.01
Verbal Subtests (WISC)				
Vocabulary	10.61	11.58	1.821	NS
Similarities	10.97	12.53	3.087	.01
Mean verbal score	10.79[a]	12.06		
Performance Subtests (WISC)				
Block Design	10.25	11.69	2.34	.05
Picture Arrangement	12.39	12.56	.278	NS
Mean performance score	11.32[a]	12.13		

* df = 70

[a] $t(35) = 1.443$, p N.S. in comparing the mean Verbal and mean performance scores of the Poor readers.

[b] Score = mean grade placement level minus Gray Oral Reading Score (in years).

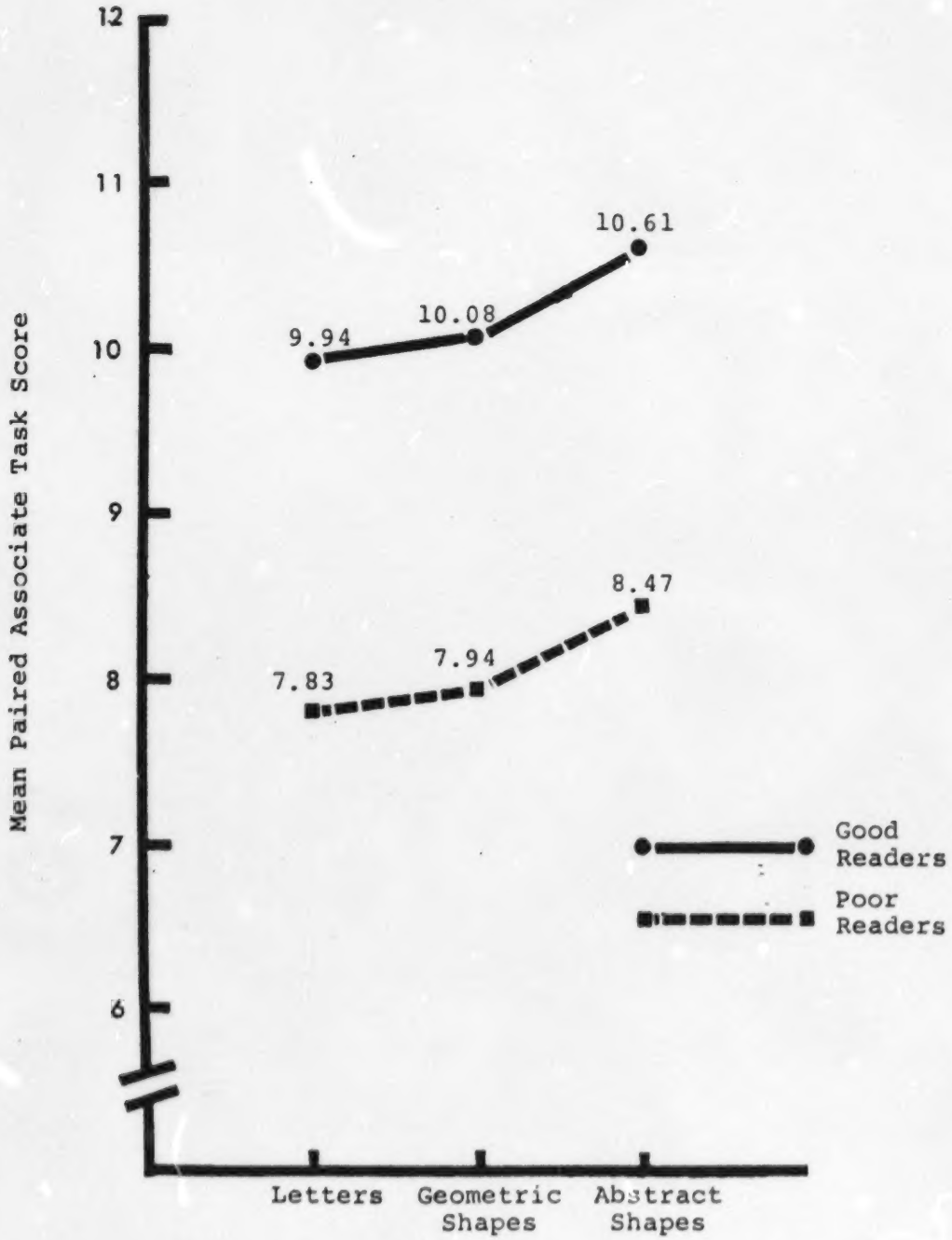

Figure 1. Mean paired associate task scores for reader group across presentation order.

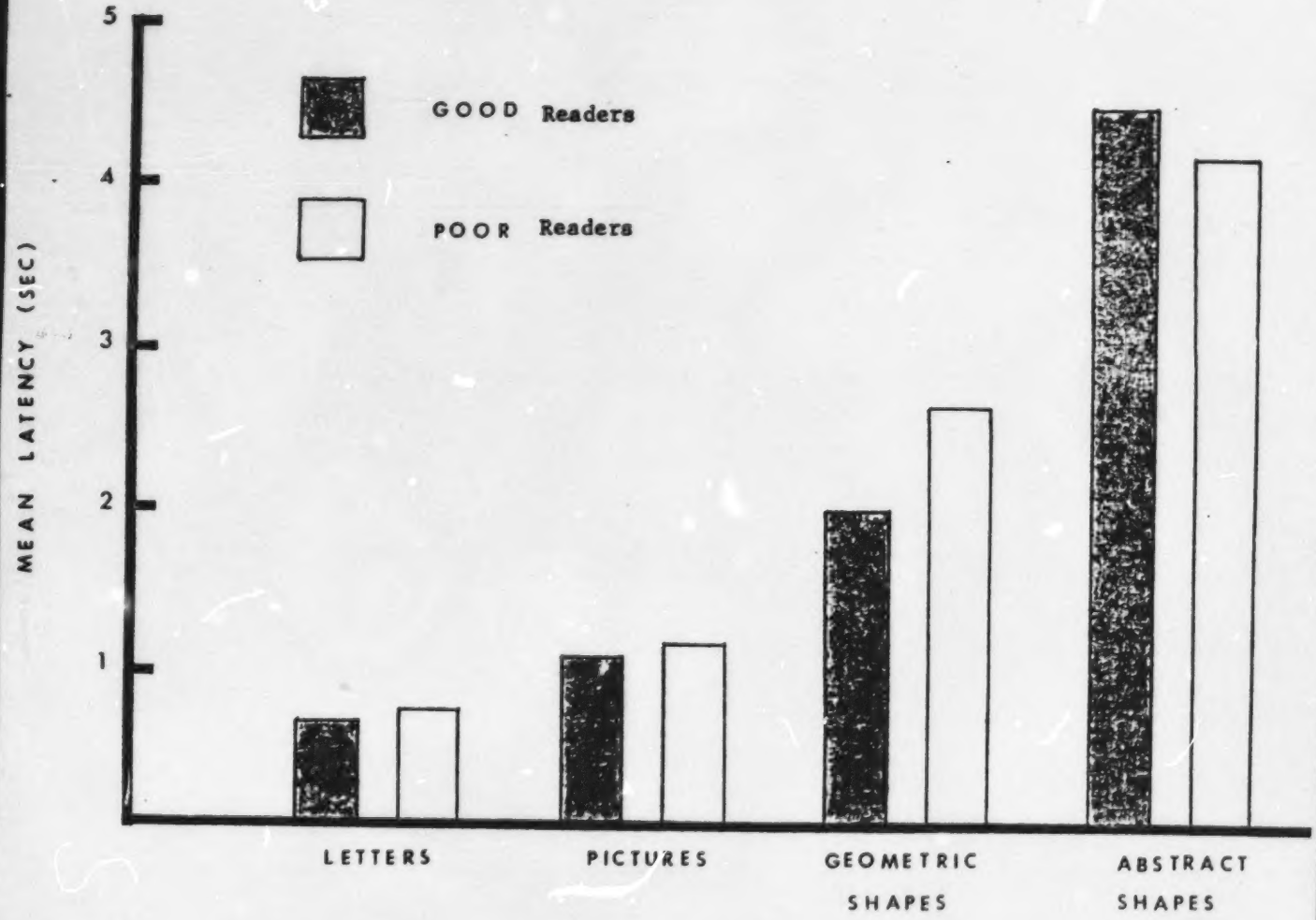

Figure 2. Mean latency to label by Reader Group across tasks

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